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De l'Acte Vital dans les Animaux, et de l'Atmosphere.

Par J. Liebig.

Of Vital Action in Animals, and of the Influence of the Atmosphere.

By J. Liebig.

[Journal de Pharmacie, vol. 1, Nos. 1 and 2, for March and April, 1842, p. 192. From Annalen der Chemie und Pharmacie, vol. xli, page 189.]

That the science of life will be largely the gainer by the recent progress of Organic Chemistry there can be, we think, but little doubt. Many intricate processes of the animal economy which, hitherto, as a cloak to our ignorance, we have been accustomed to call vital, will ultimately be found to depend on the operation of laws unequivocally chemical and physical. Others again are under the control of agencies entirely distinct from those which influence inert matter, and of whose intimate nature we will ever probably remain in ignorance, and whose laws will be the general expression of their phenomena, or of the conditions under which these take place. It must be borne in mind that organic chemistry, as a science, is yet in its infancy, and that it must mature by parts, if a vigorous manhood is expected. Many of its results will, doubtless, hereafter be found defective, for its laws are yet but imperfectly known; but this we conceive to be no argument against its steady prosecution. Its ultimate haven is usefulness. We fear more injury to it from its injudicious admirers than from its avowed enemies. The claims of the former are too eager, too presumptuous—disappointment may induce apathy, and finally disgust. Its own strength and merits are a sufficient protection against the attacks of the latter. Among its ardent and successful cultivators Professor Liebig certainly stands prëeminent. In his treatise on Agricultural Chemistry, he announces a similar work on Animal Physiology. Many of the prominent ideas of this were, it seems, embodied in a lecture delivered at Giessen, in the winter of 1840,–'41, and have since been widely promulgated by his auditory on that occasion. It is, therefore, to assert his claims to priority, that Professor Leibig has

made the present publication. We propose to present our readers with a brief outline of his novel views.

The ingestion of aliment and the absorption of oxygen are the essential conditions of life. According to Lavoisier, an adult man receives in the course of one year 746 pounds of oxygen, and that without any appreciable change in his weight. This oxygen is eliminated in combination with carbon and hydrogen, forming carbonic acid and watery vapour. Admitting, with Lavoisier and Seguin, that an adult man absorbs daily sixty-five and a half ounces of oxygen, (46037 cubic inches=15661 grains by weight,) and that we estimate the mass of the blood at twenty-four pounds, with eighty per cent. of water, it results, from the known composition of the blood, that for the complete transformation of its carbon and of its hydrogen into carbonic acid and water, 66040 grains of oxygen would be required in four days and five hours. It is necessary, therefore, to introduce sufficient oxygen and carbon into the body to make up for the loss, and this is done by means of the food. An adult who takes ordinary exercise, consumes 27.8½ ounces of carbon per day, and this is disengaged, by means of the lungs and skin, in the form of carbonic acid gas. Now, for its transformation into carbonic acid, these 27.8½ ounces of carbon require seventy-four and a half ounces of oxygen. As no portion of the absorbed oxygen leaves the body in any other form than in combination with carbon and hydrogen, and, moreover, as the carbon and hydrogen eliminated are again replaced by carbon and hydrogen, which is introduced with the food, it is clear that *the nourishment necessary to the animal organism for its preservation, is in direct ratio with that of the oxygen absorbed.* Two animals who absorb in a given time, by the lungs and skin, unequal portions of oxygen, consume, in like proportion, unequal weights of the same food. The consumption of oxygen in a given time may be represented by the number of respirations; it follows, then, that in one and the same animal, the quantity of necessary aliment varies according to the force and number of the respirations. An infant, whose respiration is active, requires nourishment more frequently, and in larger proportional quantity, than an adult, and is, therefore, less able to support hunger. A bird, in whom the respiratory function is active, dies on the third day of hunger; a serpent, whose respiration is most sluggish, lives more than three months without food. The number of respirations in a state of repose and of action varies; the amount of necessary nourishment in the two states should be in proportion. Excess of nourishment, and a deficient supply of oxygen, great movement and feeble digestive organs, are incompatible.

The quantity of oxygen absorbed by the lungs does not depend alone on the number of respirations, but also on the temperature of the respired air. The capacity of the thoracic cavity is fixed, and at each inspiration a certain quantity of air enters, which may be considered as at a fixed volume; but its weight, and that of the oxygen which it contains, varies. Air is rarified

by heat; condensed by cold. An equal volume of hot air and of cold air contains unequal portions of oxygen. If an adult absorb, at 25° C., 46037 cubic inches of oxygen, its weight would be sixty-five and a half ounces. In the inspiration of the same amount of oxygen, at 0° C., there are seventy cubic inches absorbed in the same time. In summer and in winter, at the equator and at the pole, we inspire a given volume of air; and if, in a given number of inspirations, we absorb, in summer, sixty-five and a half ounces of oxygen, the quantity absorbed at 0° rises to seventy. It is fifty-seven in Sicily at 35°, and seventy-two at — 10° The oxygen is eliminated after having undergone the same change in summer as in winter. At a low temperature we expire more carbon than we do at a high temperature, and consequently our food should contain proportionally more carbon in Sweden than in Sicily. In our temperate latitudes we should thus consume one-eighth more in winter than in summer. Such, indeed, is the order of nature; for the fruits which serve for nourishment to the inhabitant of the tropics, do not contain, when fresh, more than twelve per cent. of carbon, whilst the fat and whale oil, consumed by the inhabitant of the polar regions, contain from sixty-six to eighty per cent.

The reciprocity of action between the principles of the elements, and the oxygen disseminated throughout the body by the circulation of the blood, is the source of the animal heat. All living beings, whose existence depends on the absorption of oxygen, have a source of heat independent of the surrounding medium; and it is only those parts of the body accessible to arterial blood, and through it to the oxygen absorbed during the act of respiration, that maintain their own heat. The hair, wool, and feathers, have not an independent temperature. This elevated temperature of the animal body is everywhere, and in every circumstance, the result of the combination of a combustible substance with oxygen. The carbon of the food developes, in transforming itself into carbonic acid in the animal economy, the same amount of heat as if the combustion took place in the air, or in oxygen. It is clear that the quantity of oxygen, introduced at given periods by the act of respiration, ought to augment or diminish the amount of caloric liberated. Animals who have a lively and rapid respiration, and who consequently consume much oxygen, have a higher temperature than those who absorb less; an infant (39°) more than an adult, (37°.5;) a bird more (40—41°) than a quadruped, (37—38°;) and this last more than a fish or amphibious animal, whose temperature is only $1\frac{1}{2}$° to 2° above the surrounding medium. Observation shows, that in all climates the temperature of man and of all warm blooded animals never varies, in spite of the immense difference in their modes of existence. The animal body is a warmed body, and observes the same relation to the surrounding medium as warm bodies in general, and receives heat if the exterior temperature is higher, and gives it if it be lower. The temperature of Palermo is the same or nearly the same as the average temperature of the body; but at the polar regions it is lower by 40° to 50°,

and yet the temperature of the inhabitant of the two places is identical. This fact proves that the loss of heat is repaired immediately in the animal body, and this more rapidly in winter than in summer, at the pole than at the equator. Now in different climates, the quantity of oxygen that enters the body in respiration varies according to the temperature of the atmosphere; the quantity of inspired oxygen augments with the loss of air by cooling; that of the carbon and hydrogen, necessary for combination with this oxygen; ought to augment in a similar proportion.

It is clear that the reparation of heat is due to the reciprocal action of the principles of the elements, which become combined with the inspired oxygen. Whatever form the food takes in the body; whatever changes it undergoes, the last is the transformation of its carbon into carbonic acid, and of its hydrogen into watery vapour. The azote and the carbon not consumed by the oxygen, are eliminated by the urine and the solid excrements. The food is the combustible. It is by the aid of a sufficient absorption of oxygen that we obtain the heat developed by its oxydation. In winter, by exercise in the cold air, where the quantity of oxygen inspired is augmented, the demand for food, rich in carbon and hydrogen, increases in the same proportion; and it is the satisfaction of this want that procures us the most effectual defence against severe cold. A starved man freezes; and it is known that the carnivorous animals of northern climates are much more voracious than those of more southern countries.

In the cold and temperate zones the air, which has a continued tendency to destroy our body, excites us to labour, and to proper efforts to enable us to resist that tendency; whilst in warm climates the exigencies to procure food are by no means so pressing. Our habits are the equivalents of our food; the hotter it is the less strong is the desire to eat, precisely because the loss of heat, the cooling, and the necessity for reparation diminish. If we went naked as the Indian, or, if we were at the chase and fishing, exposed to the same degree of cold as the Samoide, we could devour half a calf, and a dozen of candles to boot, drink in proportion the same quantity of brandy or of train oil, precisely because their proportions of carbon and oxygen serve to establish an equilibrium with the external temperature. The necessary quantity is then regulated by the number of respirations, and by the temperature of the air that we respire, and by the quantity of heat that we give to exterior bodies. All facts concur to prove the truth of this law of nature. The Neapolitan cannot, without permanent or temporary injury, consume in his aliment, more carbon and hydrogen than he expires; and no inhabitant of the north can expire a greater quantity of these elements than have been introduced in his aliment, if he is neither sick nor hungry. The Englishman sees with regret his appetite, which is so often a source of enjoyment to him, lost in Jamaica, and he, in fact, succeeds, by Cayenne pepper and other strong stimulants, in taking the same amount of food as in his own country. But the carbon introduced into his body (by the food) is

not consumed ; the temperature of the air is too elevated ; and an enervating heat does not permit an augmentation of the respirations, (by movement and exercise,) and thus place the consumption in ratio with the quantity introduced into the economy. In opposition to this conduct, when in certain patients the digestive organs are weakened, or lose the power of reducing the aliments to a condition to combine with oxygen, they consequently produce less resistance than the climate and the temperature require, and England sends them to a southern country, where the quantity of oxygen inspired decreases in a great proportion, and an amelioration in the state of health ensues. The digestive organs, in a diseased state, have enough power to place the least quantity of aliment in relation with the oxygen employed ; in a climate less cold the respiratory organs should be subservient themselves to this resistance. In summer we have the diseases of carbon—of the liver ; the diseases of oxygen—of the lungs, in winter. The cooling of the body, from whatever cause, requires a greater quantity of food. Simply being in the air, in a carriage, or on the deck of a vessel, augments, by radiation and increase of evaporation, the loss of heat, without even any increase of movement. The same happens to those accustomed to drink large quantities of cold water ; it increases the appetite ; and a delicate constitution ought to restore, by exercise to the body, the oxygen necessary to the repairing of the heat lost.

Singing, talking, damp air, exercise an appreciable and determinate action upon the quantity of aliment to be consumed. We have seen that it is principally the carbon and hydrogen which serve, in combination with oxygen, to the production of animal heat; but hydrogen does not play a less important part than carbon. We know the origin of the carbon and of the hydrogen, for we see them diminish in the body with the duration of hunger. The first effect of hunger is a disappearance of the adipose matter. Each day sixty-five and a half ounces of oxygen enters the body of a starving man, and carries off a portion of the fat in leaving it. Animals who sleep during winter, as well as the periodical accumulation of grease in others, which disappears at other periods of their life, are all well known facts, which prove that there is no selection on the part of the oxygen. It combines with all that is presented to it, and for want of hydrogen it combines with the carbon, because, at the temperature of the body, the affinity of the hydrogen for oxygen is greatly superior to that of carbon. We know, in fact, that herbivorous animals expire a volume of carbonic acid equal to that of the oxygen inspired, whilst the carnivora, the only class of animals whose nourishment contains fat, absorb a greater quantity of oxygen than corresponds to the volume of carbonic acid expired; positive experiments have shown that, in certain cases there is expired, in the form of carbonic acid, only one-half of the volume of oxygen. But among those who die of hunger, the fat alone does not disappear; all the solid and soluble substances are absorbed by degrees. In the bodies of individuals dead of hunger, the muscles are soft and

flaccid, and have lost their contractility; all parts of the body which were capable of passing to an active state, have served to protect the rest of the organs against the destruction of the atmosphere. In the last place, the brain takes part in this general oxydation; from this results wandering, delirium, death; all resistance ceases: chemical action and putrefaction commence, and all the parts of the body combine with oxygen. The time in which a person starves to death is regulated by the degree of fat, the amount of exercise and work, the temperature of the air, and the presence or absence of water.

In all chronic diseases death is due to the same cause—the action of the atmosphere. If the substances destined in the organism to the maintenance of the respiratory act fail; if the organs of the patients refuse to perform their duties; if they lose the faculty of bringing, for their own defence, the ingested food to that state where its elements can combine with the oxygen of the air, their own substance, the fat, the brain, the muscles and nerves are employed for this purpose.

The real cause of death in these cases is in the respiratory act—the action of the atmosphere. Want of nourishment, want of the faculty to assimilate to the organism, is want of resistance; it is the negative cause of the cessation of the vital activity. The flame is extinguished because the oil is consumed; the oxygen of the air has consumed it.

In certain states of disease, certain non-assimilable substances are produced; the simple abstinence from food eliminates them from the body; they disappear without leaving any trace,—their elements combining with the oxygen of the air.

From the moment that the function of the skin or of the lung experiences a perturbation, there appear in the urine substances rich in carbon, and it becomes of a dark brown colour. The respiration is the pendulum, the cause of movement; the respirations are the oscillations of the pendulum, which regulate it.

The practical bearing of many of the foregoing views will, no doubt, be fully appreciated by most of our readers. In his Theory of Animal Heat, Professor Leibig seems to incline to the Chemical School. We think that, from the most recent inquiries on this subject, we should look to the organic processes as its source, and that its generation and maintenance is due in a great measure to the molecular changes which occur in the systemic capillaries, and that though influenced by the nervous system, it is not dependent upon it. The late experiments of Bischoff and Magnus satisfactorily prove that the union between the oxygen and carbon occurs in the course of the circulation, and that it is there that the blood acquires its higher temperature. In plants, it has been shown that the amount of caloric evolved is in direct proportion to the activity of the vital processes, and attains its maximum at the periods of germination and flowering. According to Dr. Carpenter, the

sexual apparatus of the Arum Italicum has been found to consume 132 times its own bulk of oxygen in twenty-four hours.

The experiments of Dulong and Despretz indicate, unequivocally, another source of animal heat besides the respiration; for they found that the caloric derived from the union of the carbon and hydrogen amounted, in herbivora to seven-tenths, and in carnivora to one-half only of the whole heat developed.

That the evolution of caloric in animals is dependent on certain chemical alterations occurring in the living system, and that the amount liberated observes a constant relation to the activity of these functions, derives interesting confirmation from the observations of Mr. Newport, on the development of heat in the Insect Tribe. In their larva state they have no independent heat, their temperature fluctuating with that of the surrounding medium, and their respiratory apparatus is very imperfectly developed. In the perfect insect, where the organs of respiration are largely developed, the temperature of the body frequently rises 10° to 15° F., above the air. The volant insects, who have the largest respiratory apparatus, have the highest temperature.

That the cutaneous surface in the higher animals is still an aërating apparatus, and contributes in a great degree to the maintenance of the animal heat, has been shown by the investigations of Breschet and Becquerel. They removed from rabbits their hair, and coated them over with a composition composed of glue, suet and resin, impermeable to air. The temperature of one rabbit, which was 100° F., before the operation, fell, when the material was dry, to 89½° F., and in the course of an hour to 76° F. In another animal, when the plaster was completely dry, the temperature fell to 67° F., and it died in the course of an hour. When the function of the lungs is materially impaired by organic disease, how far the cutaneous surface becomes a vicarious organ, and in what degree the phenomena of hectic are involved in this compensatory action, would, it strikes us, be an interesting and legitimate object of inquiry. M. C.

THE MEDICAL EXAMINER.

PHILADELPHIA, JULY 23, 1842.

Some months since we published an advertisement extracted from a newspaper, purporting that the author had discovered a new method of treating strictures of the urethra, and warranting a cure even in the worst cases. We then thought it our duty to express our disapprobation of such advertisements, in which we are pleased to find that we are sustained by our co-

temporary, the American Journal, as well as by the general feeling of the profession. We at the same time stated, that we regretted that the advertisement came from a surgeon of eminence, whose example was, therefore, of no little importance.

Within a few days we have received a letter from Dr. J. P. Mettauer, of Prince Edward Court House, Virginia, the author of the advertisement; it is written in a manly and gentleman-like tone, and we are very happy to state the reasons which determined the author to this unusual course. He has not made his method a secret, but has freely communicated it to his professional friends, and is at this time preparing a memoir and course of lectures upon the subject. But his investigations and his instruments were not at the time complete, and he was unwilling to lose the merit of the discovery, which would have been placed at the mercy of persons who might abuse the information.

We are also glad to state our belief that Dr. Mettauer is perfectly free from the suspicion of concealing a method of treatment for the sake of gain; but although he was actuated by the reasons which he has assigned, we still think that all advertisements warranting cures, even by means of old and well known methods, are wrong, and that Dr. Mettauer has taken a view of the subject which is erroneous, and at variance with the general feelings and practice of the profession. An easy mode of testing the matter is to extend the application of the principle. Many persons imagine, on much less valid grounds than Dr. Mettauer, that they possess peculiar skill in the treatment of different diseases, and if they are sustained by the example of men eminent in the profession, they would eagerly seize the opportunity of making public their claims by newspaper advertisements. It is easy to imagine what the result would be, and what influence such a course would have upon the profession, as well as upon the public. For these reasons, the different medical associations in Europe and America have either expressly or tacitly discountenanced all advertisements of a nature similar to the one in question.

We have not the pleasure of a personal acquaintance with Dr. Mettauer, but we have many common friends, and his reputation as a skilful surgeon and able writer is well known to us; it is therefore with regret that we differ with him on a question of ethics. We shall not, however, be the less pleased to communicate the results of his researches to our readers as soon as they are published, and hope that they will give us much new and solid information as to the treatment of a most troublesome class of disorders—the diseases of the urinary organs.

ANALECTA.

Case of General Hæmorrhagic Tendency. By R. T. Hunt, Surgeon of Manchester. (Hereditary Hæmorrhage?)—The injuries, of which the following communication contains an account, occurred to Wil-

liam Lawson, aged seven and a-half years. He had no peculiarity of appearance. He had brown hair, gray eyes, moderately clear but not florid complexion, but was at this time (Nov. 7, 1834,) thinner than formerly, apparently in consequence of recent severe hæmorrhage. He was always remarkably active and daring, and very passionate. His father, an engraver, had always experienced some difficulty in stopping the bleeding when his fingers were cut with the graver. He died of apoplexy a few months since. His mother, who has had a numerous family, is reported always to have suffered from hæmorrhage after labour. She states that when William was only a day or two old, such profuse bleeding occurred from the navel, that for many days he was not expected to live; that during the first year he suffered almost constantly from diarrhœa, and occasionally from tooth fever; and that when about two years old, he fell against the fender and cut his his head. The wound did not bleed much at the time, but the second night afterwards the bleeding increased so much that it was with great difficulty stopped by plaster and bandages.

February 3d, 1833. As he was sliding astride down the banister-rail, he slipped and fell, with his mouth open, against the end of the rail, and thus lacerated the inside of the upper lip near the frænum, which was partially divided; the gums also were torn, and separated from the alveoli. It was an injury that would have caused considerable hæmorrhage from any individual, but the bleeding, for the first two days, was not of any consequence.

5. I saw him for the first time, the bleeding having become very profuse during the last night. There were coagula between the lips and teeth, continual general oozing of arterial-coloured blood from the injured surface, but no jet, nor any vessel bleeding separately, perceptible. A common astringent lotion was applied, and, afterwards, spirit. terebinthinæ, and argenti nitras in substance, by which means the bleeding was slightly checked, but returned at intervals until its effects upon the system had become truly alarming.

7. He was now quite blanched; his voice could scarcely be heard, nor could he raise himself in bed; his extremities were cool; his pulse quick, feeble, small, and irregular; and his pupils widely dilated. He would take nothing but a little milk and water, and that only occasionally, in consequence of his fearing that it would increase the bleeding. The actual cautery was now freely applied, with the effect of stopping the hæmorrhage, of which there was no recurrence; and in a few days he was sufficiently well to go out, though still much debilitated. The only medicine he took was a common aperient.

March 4. The skin over the left eyebrow was slightly grazed by a brass shoe-horn thrown at him by one of his brothers. The next day when I saw him, blood was constantly oozing from the wound, and no vessel large enough for a ligature perceptible. I applied a very thick compress of lint, supported by adhesive plaster and a bandage. In the morning the dressings were separated from the wound by a coagulum as large as a walnut, which had apparently thrust them off. The nitrate of silver was applied, the dressings replaced, and there was no more hæmorrhage.

April 3d, 1834. I again saw him in consequence of bleeding of the tongue. Two days before he had fallen over a wheelbarrow, and slightly bit his tongue in two places. There had been occasional bleeding till the night of April 2, when it became excessive, the mouth having been repeatedly filled with large

coagula. The nitrate of silver in substance was first applied, and a strong alum lotion, the bleeding still recurring. The actual cautery was used three times during the day, a short cessation of the hæmorrhage following each application.

4. The bleeding having continued, the actual cautery was repeated, and lint soaked in spirit. terebinthinæ applied. The system now began to suffer very severely from the loss of blood. The same treatment was continued during the 5th and 6th.

7. The patient being now apparently sinking, two small pieces of wood were applied, one upon, the other under the tongue, and both posterior to the wounds. These pieces were connected at their extremities by ligatures, by means of tightening which, the tongue was forcibly compressed. This instrument was kept on for twelve hours, when the anterior part of the tongue had become swollen, inflamed, and almost gangrenous, in consequence of which the pieces of wood were removed. Eight hours afterwards the hæmorrhage returned, but was for some time checked by the application of lint soaked in spirit. terebinthinæ. The tongue having by this time recovered from the previous effects of pressure, a pair of spring forceps guarded with lint was applied, but caused so much pain as to render its removal necessary. The instrument, formerly mentioned, was again applied and retained for twelve hours, after which time the hæmorrhage, which had continued nine days after the accident, with the exception of the intervals recorded, fortunately did not return. No medicine was given until the cessation of the bleeding.

June 15, 1835. He was struck on the vertex with a stone, which caused an irregularly-triangular laceration, penetrating nearly to the cranium. There was immediately considerable bleeding, which could not be stopped by the usual dressings. On taking off the bandages his mother had applied, a large coagulum was found attached to the lacerated parts, from beneath which blood was continually oozing. After removing this coagulum, a tent of lint was firmly thrust into the wound, and secured in this position by means of strips of lint spread with white of egg and flour, which, in a short time, formed a compact hard covering, nearly as solid as a crab's shell. The following mixture was prescribed :—

Sulphate of soda, one ounce ;
Water, six ounces.

To take an ounce every four hours.

16, 9 A. M. The bleeding had continued all night, and the wound presented nearly the same appearances as before. The dressings were renewed, and the dose of sulphate of soda doubled.

9 P. M. The wound bled during the afternoon, but not so freely. The sulphate has not yet acted upon the bowels. The nitrate of silver was applied to the wound, and the dressings replaced.

17. The sulphate of soda has produced several free alvine evacuations, and no more bleeding has occurred.

22. No further hæmorrhage. The dressings firmly adherent, and required the application of poultices for their removal.

This boy had never suffered from hæmorrhage of an idiopathic character from any of the mucous surfaces, nor from purpura or any peculiar cutaneous affection.

William Lawson's mother died, the family became dispersed, and after many fruitless inquiries, I at length, by chance, discovered that he had been

admitted into the Manchester Bluecoat School; and, on applying to Mr. Greswell, the surgeon to that institution, he kindly informed me that Lawson had died in August, 1840, in consequence of convulsions supervening upon an abdominal affection, apparently caused by too freely eating of fruit, and bathing when in a state of perspiration. There was no post-mortem examination. During his residence in the school he had a slight injury of the hand, which was followed by very troublesome bleeding, similar to that produced by the accidents previously noticed.

Remarks.

The cases of hæmorrhagic tendency, which first attracted the attention of pathologists, will be found in the "London Medical and Surgical Journal" for 1808, in a communication from Dr. Otto, of Philadelphia, U. S. Upon reference to these and other analogous cases, it will be noticed that some time usually elapsed after the receipt of the injury, previously to the appearance of severe hæmorrhage, the wound not bleeding in the first instance more than similar wounds in other individuals. This is important; for if we compare the time at which adhesion generally takes place, I believe it will be found to agree with the period of the supervention of hæmorrhage in these instances, provided the injuries be of equal severity. In such hæmorrhagic cases, the process, which has been termed adhesive inflammation, appears not to be accomplished in a normal manner, although the vascular action of the injured parts is increased to an extent apparently sufficient for all the purposes of adhesion. The divided extremities of the vessels, instead of becoming agglutinated by the adhesive medium, not only remain pervious, but appear to acquire an increase in calibre, which allows them to pour out blood so freely as to give it the appearance of exuding from every point of the surfaces of the wound. Whether this irregular performance of the adhesive process depends upon the peculiar condition of the blood in such individuals, or upon some difference in the arrangement of their capillary system, is a question not to be very easily answered. The case I have recorded, is a proof that there is no deficiency in the coagulative power of the blood; the coagula having firmly adhered to the surrounding uninjured structures, although the oozing from the wounds was continuous.

The failure of local treatment until the bleeding had proceeded so far as to threaten a fatal termination, and the consideration that injuries occurring in structures differing so much in their organisation were, when of equal severity, always followed by equally profuse hæmorrhage, would incline me to depend upon general treatment. I do not consider the slight trial given to the sulphate of soda in Lawson's case as very conclusive when separately viewed. But it acquires value when considered in connection with the treatment pursued in Dr. Otto's cases. I may add, that I should be inclined to place the greater reliance upon its efficacy, in consequence of my having for many years observed the beneficial effects of various saline preparations in affections of the vascular system, in which these are not usually administered.—*Prov. Med. Jour.* May 28, 1842.

[The history of the peculiar predisposition to hæmorrhage, which forms the subject of Dr. Hunt's paper, is one of growing interest, from the increasing frequency of the accident, and the well known tendency of the affection to recur by inheritance. At page 344 of the present volume, we have ex-

tracted a similar and fatal case resulting from the extraction of a tooth ; adding some comments and further references.

We observe a strong resemblance between the personal description of Dr. Hunt's patient, and our own case of hæmorrhage from the extraction of a tooth, published in 1828, both in regard to physical and moral peculiarities. As there is reason to believe that this tendency is characteristic of a peculiar temperament, it is very desirable that its distinguishing marks should be carefully observed and noticed by those who meet with it in the course of practice; and, as there are several families in the United States in whom it is known to be very strongly marked, the opportunity cannot be long wanting. A very singular peculiarity in the hereditary course of the affection has been noticed by Professor Elsaesser and others. It appears to be chiefly, though not absolutely confined to males ; it frequently skips a generation entirely ; and, in at least one instance, it has affected exclusively the male descendants in the female line. We should be glad to receive further information on these curious points, which, should the precepts of physiology ever be brought to exert their proper influence upon questions of matrimonial alliances, may obtain high practical importance.

From the whole evidence before the profession, it does not appear that the remedial measures hitherto essayed in such cases can claim any very powerful support. The statements of Dr. Otto, and succeeding observers, in favour of the exhibition of sulphate of soda, are not of great weight when critically examined. In mild cases, like that of Dr. Hunt, the hæmorrhage has often been arrested under circumstances in which the agency of the remedial measures is, at least, very doubtful ; and in those of a more severe character, mechanical pressure and all the styptics, including the various caustics, have not produced more than a debateable and very temporary benefit. Dr. Hunt succeeded, on one occasion, with the actual cautery, and a very few other instances of similar success are on record ; but, in the case narrated at page 344, not only did it fail, but an accidental touch of the iron to the lip of the patient established a new point of hæmorrhage; and in our own case, already referred to, the burning extended the bleeding surface; the discharge at first oozing through the sloughs, and finally flowing through the uninjured gum beyond the limits of the action of the iron, and the mechanical pressure superadded upon them.

Agreeing with Dr. Hunt in the belief that we must look to general treatment rather than the usual local measures for success, we again urge the opiate treatment upon the notice of the profession, for reasons which are stated in our original paper on the subject.] R. C.

Abstract of Professor Heim's Paper on the identity of Small-pox and Cow-pock.—The first notice of Dr. Gassner's experiments is to be found in No. 67 of the " Salzburgher Medic. Zeitg., 1807," in the following terms :—

"*Günzburg.*—Dr. Gassner has inoculated several cows with small-pox lymph, and eleven of the cows have taken the cow-pock. With the matter thus obtained, four children of a curate were vaccinated, and a very fine cow-pock ensued." In the year 1807, an inquiry was held by order of the Minister of the Interior on the announcement just alluded to. Dr. Gassner himself was examined, and declared that in May, 1801, he had made the experiments mentioned. No effect was produced on ten cows; the eleventh he inoculated with the most perfect success. He described the progress of the disease as follows:—On the second, third, and fourth days, nothing was observed in the points where the matter had been introduced; on the fifth day, however, a small red point formed over each; on the sixth, a small transparent vesicle; on the seventh, the vesicle was converted into a bulla *(blase)*, which was surrounded with a reddish circle on the eighth and ninth days; on the tenth day, the whole of the bulla was of a bluish pearl colour, and the lymph was, on this day, taken from it. On the eleventh, the udder was swollen, febrile symptoms set in and continued to the twelfth, when the tumefaction of the udder abated; the pustule was now of a whitish colour. On the thirteenth, the animal began to eat, and there was a depression in the middle of the pustule, which turned into a yellow crust on the fourteenth. From the fifteenth to the sixteenth, the crust became brown, then darker, and remained on to the twenty-eighth day.

Dr. Gassner vaccinated with the lymph several children in the rectory-house at Riedheim, and from them, seventeen others at Schönenberg. The appearances of the pock were perfect.

These circumstances were examined into by the commission of inquiry, who came to the conclusion that the facts averred by Dr. Gassner were a pure fiction.

On the other hand, Professor Heim inquired minutely into all the circumstances of the case, and says he is convinced of the variolation of the cow, and of the transmission from her of a disease similar to vaccinia.

In addition to the evidence collected from the surviving children of the curate, vaccinated by Dr. Gassner, of a contemporary witness, the schoolmaster of Nübling, Professor Heim cites a letter addressed by Dr. Gassner to Dr. V. Ehrhart, and published in his "Sammlung von Beobactungen, 1. B. 1. H. Nürnberg, 1803, s. 94." The following is an extract from this letter:—"I have endeavored to ascertain by experiment the nature of the vaccine lymph. The report that I have inoculated several cows with small-pox is true; the result on the eleventh cow was perfect, and fully bore out the ideas which I had formed from analogy; I vaccinated with the lymph obtained from this cow the four children of a curate at Riedheim, and a beautiful cow-pock was produced. The matter with which I succeeded in producing the disease in the cow was taken from a child labouring under malignant small-pox at Züigen." The letter bears date, Günzberg, April 26, 1802.—*Prov. Med. Jour. May* 21, 1842.

Dr. J. B. S. Jackson, who is well known to the profession as an ardent cultivator of pathological anatomy, has given us the results of his observations as to the "Comparative Frequency of Tuberculous Disease."

Comparative Frequency of Tuberculous Disease. By J. B. S. Jackson, M. D.—The following is an analysis of dissections made during the last ten

years in this city or the immediate vicinity, and tending to confirm the general statement, that in the temperate latitudes about one-sixth, or more, of our race die from some form of tuberculous disease.

The whole number of autopsies I find to be 604.

Of these there were excluded 94 cases of patients dying from disease foreign to the lungs, and in which these organs were not at all, or not sufficiently, examined; also four cases in which there was a question between pneumonia and tuberculous disease.

Of phthisis there were 93 cases. Amongst these were included some cases of general tuberculous disease in children, and in which some of the other organs may have been as much, or more affected than the lungs. One of these last was a child that died of tuberculous disease of the brain, with considerable disease of the bronchial glands, and only a trace in the lungs.

Acute meningitis in 16 cases, tuberculous disease being found in all of them, either in the lungs, the bronchial glands, or in both. The disease was undoubtedly tubercular, though in the first four cases reported, granulations are not mentioned as having been found in the membranes of the brain, not being acquainted, at that time, with the true nature of the disease.

A case of tubercular peritonitis, also, may be mentioned, in which, though the bronchial glands were considerably diseased, a single granulation only was found in the lungs.

In the above 604 cases, then, death is supposed to have been caused by tuberculous disease in 110, or in about one in $5\frac{1}{2}$.

In the remaining 396 cases, death was caused by some other than tubercular disease; but in all, the lungs were examined, and in a large proportion it is expressly stated whether there was, or was not found any such disease. Without doubt, the existence of tuberculous disease was occasionally overlooked, but, on the contrary, it was often noted when found in a very small or even minute quantity.

In the above 396 cases, there was no tuberculous disease nor any remains of any found in 306; the wilted appearance, so often met with at the apex of the lungs, not being considered as satisfactory evidence of the disease having formerly existed. The existence of cretaceous matter, however, was so considered, and cases where this was found were noted as tuberculous, without any discrimination. In 46 cases, tubercles were found it the lungs alone, and in 21 in the lungs and bronchial glands. In 20 they existed only in the bronchial glands, and were in the cretaceous form in all except two. In two cases there were cretaceous masses in the upper part of the thorax, supposed to be the result of old tuberculous disease, though there was no appearance of this last in the lungs, nor in the bronchial glands; neither was there in another case in which an extensive cretaceous deposit was found in the renal capsules, and which was similarly explained.

Several years since my attention was directed to the subject of the infrequency of the occurrence of the tubercular deposit in patients dying from malignant disease, and I was not aware, for some time, that the same remark had been made by others. Of 33 cases of malignant disease, in nearly all of which a careful examination was made for tubercles, it is expressly stated that in 24 none were found; six times they were found in the lungs alone, and in the bronchial glands alone three times.

Of 35 patients dying of various diseases, all of whom were decidedly intemperate, and most of them grossly, in 26 no tubercles were found; in five there were tubercles in the lungs; in one in the bronchial glands; in one in

the lungs and bronchial glands; and only two died of phthisis. In several of the most striking, the organs were as free from tuberculous disease as those of a new-born infant. All of these 35 are stated, in the recorded history of the case, to have been intemperate; probably others are so recorded, and the list might have been considerably increased; but no case has been referred to under this head, except where I happened to remember that the patient had been intemperate.

Intemperance certainly does not seem to develope tubercles, even if it has not some effect as a prophylactic; the remedy, to be sure, would be worse than the disease; but has it any such effect?—*New England Quarterly Journal of Med. and Surg. July*, 1842.

The last remark, as to the comparative rarity of tuberculous disease in confirmed drunkards, has often occurred to us while in attendance upon a public institution in which a large number of very intemperate people are admitted. In conversation with the resident physicians at the visit, this fact was often alluded to, and the correctness of it was generally admitted. Long continued drunkenness produces a different class of diseases from phthisis; that is, of the heart, liver, kidneys, and of the brain. Individuals who are predisposed to phthisis are, however, often victims to intemperance, which proves fatal to many tuberculous subjects; but if they resist the first injurious results of their habits, they fall into a different condition from that of tuberculous subjects, become bloated rather than emaciated, and suffer from another set of symptoms.

Effects of a Diet of Fruit and Saccharine Food. By S. Rowbotham, M. D.—In September last (1841) I met with a Mr. Fielding, who resides in John-street, Stockport, Cheshire, and he named to me the case of his child, which had then been ill eighteen months; he asserted that such a case was never heard of before, and desired me to see it. I accordingly went to his residence. On entering the house the stench was almost intolerable: this I was told had existed for some time. The child was a boy three years old. It was covered from head to foot with ulcers. Its eyes, nose, ears, and mouth, and, in fact, its whole head and face, were involved in one complete mass of fœtid running sores or ulcers. The lower parts of its body were the same; the anus and genitals were scarcely distinguishable, and almost black; it voided urine from five or six places; and so great were its sufferings in going to stool, that it was afraid to do so until the fæces involuntarily dropped from it, when it always cried in the most pitiful manner. Its little thighs seemed to be nearly separating from its body; and for more than twelve months it had never been able to sit down even upon a pillow, but always stood upon its feet, and leaned with its elbows upon the nurse, excepting at times when it was able to kneel upon a pillow. It had scarcely been able to lie in bed for the same period, in consequence of the whole of the surface of its head and face having run into one mass of ulceration; it had been perfectly blind for nearly twelve months. During the whole of this period it was never left alone for a moment, either night or day; its belly was exceedingly enlarged and very hard. Eight of the most eminent medical men had given it up as incurable. Some of them declared that no

known mortal power could even *improve* its condition; but to think of a *cure* was madness. All who saw it agreed that it was out of the power of any human being to do it good; and any one who offered such a thing with the view of being paid for it, could be very little less than an impostor.

From certain views which I held upon the origin of disease, but which I need not state here, I was induced to recommend a diet consisting almost entirely of ripe fruits and honey, or sugar and treacle. The parents and friends of the child had long lost all hope of a cure; but could of course, see no harm in this. We accordingly commenced the new diet on the 13th of September last. In the morning it was supplied with some stewed fruits, mixed with sugar or honey, to its breakfast. The same to dinner, tea, and supper. It was allowed, and sometimes forced to be eating grapes, cherries, plums, apples, pears, and such other fruits as could be obtained, all the day through. A *little* other and ordinary food was *now and then* allowed; for previous to this change in its diet, it had almost lived entirely upon wheaten bread and butter, and bread made into porridge with milk. The appetite was so voracious that it was never satisfied; and the child would eat until its throat and mouth were crammed so full, that many times they were obliged to force out the food to prevent its being choked. On the 16th of the same month we thought the sores upon its back and neck were beginning to disappear. On the 23d it was very sensibly improved. On the 30th one half of its face was clear; its stools were made with ease; the urine was easily and freely discharged; it could sit in a chair, and lie comfortably in bed, and the lower parts of its body were much better.

In this way it went on daily improving, until at last its eyes opened, but they were very weak at first, and it could scarcely see anything; its sight, however, gradually improved. Before the new year came in, not a single ulcer remained upon its body; the skin became remarkably clear and fair; and the features, which for more than twelve months had been in such a state that it was impossible to do more than guess at the position of its nose and eyes, were restored to their wonted appearance. The father of the child at this time, when its eyes were yet exceedingly tender, in his anxiety to make known the result of the experiment, incautiously took it out without anything over its eyes; it thus took cold, and they closed up again for a few weeks; after which they again opened, and continued to strengthen and improve.

Thus, by the simple and even pleasant process of living for a time upon ripe fruits and saccharine matter,—as honey, sugar, and treacle, was a human being snatched from the grave, and from a state which, perhaps, no mortal was ever in before, and restored to health and life.—***London Lancet.***

Emetics in Confirmed Croup.—M. Marotte, in the "Gazette Médicale," enforces the necessity of repeated and large doses of emetics, aided by local depletion, mild purgatives, and blisters, in decided cases of croup. Dr. Marotte agrees with Dr. Delaroque on the necessity of acting vigorously within the first two hours from the accession of the disease: thus, he commences by applying leeches, and whilst the patient is in a state bordering on syncope, he gives large doses of emetics, being indifferent as to the particular emetic administered, and follows them up with a blister, all within an hour or an hour and a half. If the first administration of emetics only produce temporary relief, they are to be repeated every three, four, or five hours, until a decided benefit is obtained.—*Ibid.*